News Production and Broadcasting Process Reengineering Based on Internet of Things and Computer Aided Technology

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Abstract. News production and broadcasting refers to the entire process of news interview, editing, production and broadcasting. With the continuous development of various media, people have higher requirements for the real-time and authenticity of news, which promotes the management of news production and broadcasting by TV stations. The requirements are also higher. Therefore, the study of the news production and broadcasting management system is of great significance to the TV station. This article locates the business problems of news production and broadcasting of TV stations, analyzes the functions and related personnel related to this article, and based on the actual needs of news production and broadcasting of a certain town TV station, collects news materials, edits news materials, and manages news production. The news broadcast management business process is modeled, and the original business process is further optimized on the basis of the original business process; in the system function analysis part, the paper first analyzes the system roles and gives the overall system Use case diagram modeling. On this basis, the system function requirements are analyzed through use case diagrams, and the system core and functional structure are analyzed through the function package modeling form: in the data analysis part, the paper analyzes the news production and broadcasting information of a town TV station The management system control class relationship is analyzed, and then the system function data is analyzed through the abbreviated class diagram, and the system entity class relationship diagram and the system database table structure are given.

Keywords: Internet of things; news production and broadcasting; computer aided technology
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1 INTRODUCTION

Haratian and Bagherzadeh [1] think the Internet of Things refers to a new technology that connects various sensors with the existing Internet. Specifically, it is a kind of network that connects any items through the Internet through information sensing equipment and according to an agreed protocol, for information exchange and communication, in order to realize intelligent management. In this network, items can "communicate" with each other without human intervention. According to the International Telecommunication Union (ITU-T), the Internet of Things is mainly to solve the interconnection between goods and goods, people to goods, and people to people. The Internet of Things fully applies the new generation of IT technology to all walks of life to realize the integration of human society and physical systems.

Based on the technology of the Internet of Things, Dong and Ai [2] consider news gathering and editing related personnel and equipment are regarded as independent "things" and incorporated into the same network. In the early stage of construction, devices and personnel can be integrated into the same network by binding a smartphone with GPS function. Run the designated App in the mobile phone, and realize simple location and status information uploading and command receiving functions through 3G communication. After the technology is mature, professional equipment is used, the equipment is smaller and more stable, and the connection with personnel and equipment is closer, and it has a higher degree of automation and intelligence.

Muhammad et al. [3] think cloud computing includes hardware resources (such as CPU, memory, etc.) and software resources (such as application software, integrated development environment, etc.). The local device only needs to send a demand message through the network, and there will be thousands of computers on the remote end to provide you with the resources you need and return the results to the local device. In this way, the local device only needs to upload the original data and requirements, and all storage and processing are completed by the computer group provided by the cloud computing provider. Cloud computing is the core of improving the news production and broadcasting process, and must have strong computing power and massive storage space. In order to assist the news production and broadcasting process, Keivanpour and Kadi [4] think it should also implement the following functions: 1. Connect to the Internet of Things and perceive the status of all personnel and equipment in the Internet of Things in real time; 2. The processing function of different news events, reasonable arrangements, and relevant personnel Targeted release instructions; 3. Fast storage, editing and transcoding capabilities of larger videos.

Lee et al. [5] consider news refers to a kind of time-sensitive news that is spread through a certain carrier, which provides a brief description of what happened through an overview and other methods. A broadcasting station refers to a broadcasting and television transmission organization within a certain area. One of its responsibilities is to produce and broadcast news in the local area. Due to the real-time nature of news and other special attributes, news production and broadcasting are different from the production and broadcasting of other resources of TV stations. News production and broadcasting need to ensure the authenticity and real-time of news. Real-time guarantee is that news must be conducted through interviews and camera information. Accurate information transmission and news authenticity means that news should be based on actual facts and should not be exaggerated. Therefore, in the process of news production and broadcasting, it is necessary to strictly manage issues such as distortion of news production and broadcasting [6,7].

News production and broadcasting refers to the entire process of news interview, editing, production, and broadcasting. In the management of news production and broadcasting, it is necessary to manage interviewers, store and edit interview resources, and produce news through news layout, etc. The produced news is submitted for review, and the review process needs to review the authenticity and real-time nature of the news, and only the news that has passed the review can be broadcast. With the development of computer technology, news production and broadcasting management is also developing in the direction of operational information management, especially

the rapid development of network information at present, which makes news more demanding in real-time. A good news production and broadcasting management system can improve the real-time news. At the same time, through a good news production and broadcasting management platform, news editors in news production management can be managed. News editors may distort news, but news editors can also improve the readability and ease of dissemination of news. The news production and broadcasting management system can balance the distortion and readability in the news editing process [8].

News production and broadcasting management is an important management aspect of TV station management. At present, there are relevant researches on news production and broadcasting management in my country and abroad. Some scholars have published the "Exploration and Practice of HD Network Development-An Analysis of Anqing Radio and TV Station "High Definition News Production and Broadcasting Network" explores the development of TV station news production and broadcasting networks. Someone also analyzed the construction of the integrated network and the benefits of the integrated network in the operation of the TV station based on the actual needs of the Tangshan Broadcasting and Television Station in "Tangshan Broadcasting and Television Station News Production and Broadcasting-Introduction to the Integrated Network System". In addition, some scholars gave an overview of the optimization ideas of CCTV's production and broadcasting system in the "Summary of Design and Optimization of News Network Production and Broadcasting System of CCTV's New Site". In addition, there is also an architectural design and specific coding for the network production and broadcasting system in the "Design Ideas and Implementation Plan for the Storage Architecture of the News Production and Broadcasting Business System of the TV Station's HD Networked Program Production and Broadcasting System". Others gave a detailed introduction to the digital transformation of CCTV in the "Design and Practice of the Digital Transformation Project of CCTV News Production and Broadcasting System" [9].

In the research mountain of news production and broadcasting management abroad, in developed countries, the research and application of computer technology and news production and broadcasting management system started earlier than our country, and the research and application technology of news production and broadcasting system in developed countries are also more mature. , Especially in developed countries such as Europe and the United States, television stations have relatively mature news production and broadcast management systems. Because the news production and broadcasting management requirements of Chinese TV stations and foreign TV stations are different, our news production and broadcasting management system cannot fully use foreign news production and broadcasting management systems [10].

This article takes the overall research and analysis of the system in the research and analysis of the news production and broadcasting information management system of a town TV station as an example, including the research on the background of the project, the status quo of similar systems, and the analysis and design technology of object-oriented systems. In-depth research, research on unified modeling language and software engineering technology, detailed modeling of system business analysis, function analysis and data analysis, and responsible for the flow chart, optimization flow chart, and use case diagram in the process of system research and analysis Design and drawing of modeling graphics such as, package diagrams, abstract class diagrams, and entity class diagrams.

2   NEWS PRODUCTION AND BROADCASTING PROCESS REENGINEERING

The optimized business process of news material collection includes interview registration, news interviews, and news cameras. Compared with the traditional business process of news material collection, the optimized business flow chart refines the news material collection business and adopts the electronic information registration method for reporter registration. Reporters do not need to register in the editorial department in person. The division of labor between text reporters and

camera reporters is more specific. The text reporters are responsible for the specific interview work, and the camera reporters are responsible for the camera work during the interview.

There are data constraints on the activity nodes in the news material collection optimization business process. When the process enters the activity, there is a pre-state of the process. After the activity is processed, there is a post-state of the process. The business process must meet the requirements of the activity during the process. If the pre-state and post-state are not satisfied, the information processing will be abnormal, and there will be problems in the business process processing. Figure 1 is the data constraint description of the main activity nodes of the news material collection and optimization business process:

The data constraint of the press reporter's registration step for news interviews: the interview task must be received in advance.

Obtain the news interview task card and the data constraints of the equipment step: task registration is completed and the task registration card is obtained, and the assigned equipment number is obtained.

The data constraint of the camera reporter's interview registration step: the interview task must be received in advance.

Data constraints for the steps of receiving news gathering camera equipment: task registration is completed and the task registration card is obtained, and the assigned device number is obtained.

The preparation steps before the press reporter conducts news interview. Data constraints: complete task registration and equipment collection.

The data constraints of the interview implementation steps for the text reporter: complete the interview preparation, and the interviewee accepts the reporter's interview.

Data constraints for the step of recording interview content by reporters: record the interview content during the interview.
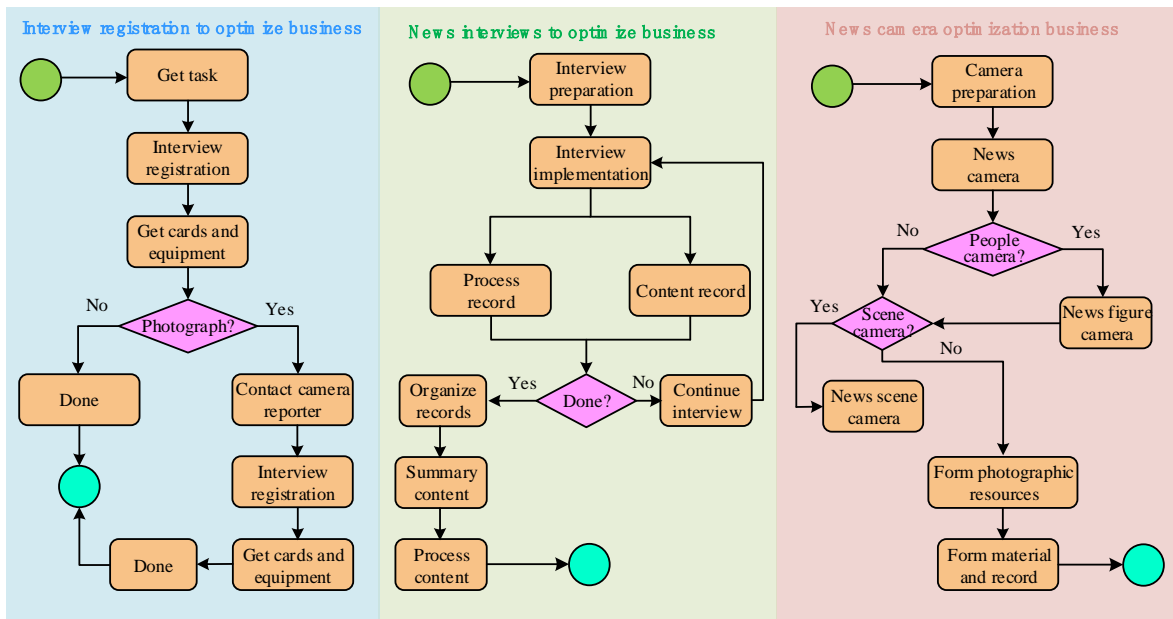

Figure 1: Business process reengineering.

The data constraint of the recording step of the reporter's interview process: record the interview process through equipment. Compile the data constraints of the reporter's news records on the interview steps: the interview is completed, but the content of the interview has not been sorted. The data constraint of the news record for the summary step of the interview: the finishing of the interview content. Form the news interview material and record the data constraints of the steps: the interview content is sorted out. The data constraints of the step of forming news interview photography resources: the completion of interviews and photography. The data constraints of the camera reporter's photographing steps of news figures: the interview is in progress, and the camera reporter is recording the interview. The data constraint of the camera reporter's step of shooting news scenes: before the end of the interview, the interview scene will be photographed.

The optimized business process of news material editing is shown in Figure 1. The optimized business process includes the review of the editing results in the material editing and the sharing function of editing materials. Compared with the traditional news material editing business process, the optimized business process optimizes the interview record editing and interview summary editing in the news material editing in more detail, removes the unreasonable process, and optimizes it through the information system. After the data management of the business process, the management efficiency has been improved.

There are data constraints on the activity nodes in the news material editing and optimization business process. When the process enters the activity, there is a pre-state of the process. After the activity is processed, there is a post-state of the process. The business process must meet the requirements of the activity during the process. If the pre-state and post-state are not satisfied, the information processing will be abnormal. At the same time, there will be problems in business process processing. The following is the data constraint description of the main activity nodes of the news material editing and optimizing business process:

Material management personnel provide materials to material editors. The data constraints of the step: material management personnel need to edit materials and provide unedited materials. Material editors have data constraints on the editing steps of interview records; obtain unedited materials. The material editor's data constraint on the review step of submitting the interview record edit: complete the interview edit and submit the interview edit. Data constraints for the step of reviewing the editing status of the interview record by the material management personnel: obtaining the interview editing, and the editing status is consistent with the submitted editing. The data constraint for the editing steps of the material editors on the interview summary: complete the editing of the interview material. Material editors have data constraints on the review steps for submitting interview summary editing; forming review data and submitting for review. The data constraints of the material management personnel review interview summary editing situation step: need to be reviewed according to review requirements. The data constraint of the editing step of the material editor on the interview task information: the interview task is the assigned interview task. Data constraints for the review step for the material editors to edit the submission of the interview task information: the edited interview task material management personnel review the data constraints of the interview task information editing step: it needs to be reviewed according to the review requirements. The data constraints of the editing steps for the interview audio and video by the material editor: the audio and video are the unedited audio and video of the interview. Data constraints for reviewing the submission of interview audio and video editing steps: audio and video editing is complete. Material management personnel review interview audio and video editing step data constraints: material editors submit for review. The material manager receives the data constraint of the edited material step: the material editing is completed.

3 DATA ANALYSIS

In the system entity relationship in this article, the first level of control is the control of the news production and broadcasting information management system of the TV station, and the second

level of control is the collection of news material, news material editing, news material sharing, news production management, and news special effects production. , News broadcast management, basic data management and system management.

The thumbnail of news material collection is shown in Figure 2 below. In the abbreviated cabinet of news material collection, text reporters and camera reporters perform news material collection control operations through the news material collection interface, and news material collection control depends on news interviews and interviews. The registration category and the news camera category, the news interview category and the interview registration category rely on the news interview information category, and the news camera category relies on the news camera information category. According to the dependence of the news material collection function on the data entity, all the attributes of the two entity classes of news interview information and news camera information are respectively given, which are the basis for constructing database tables.
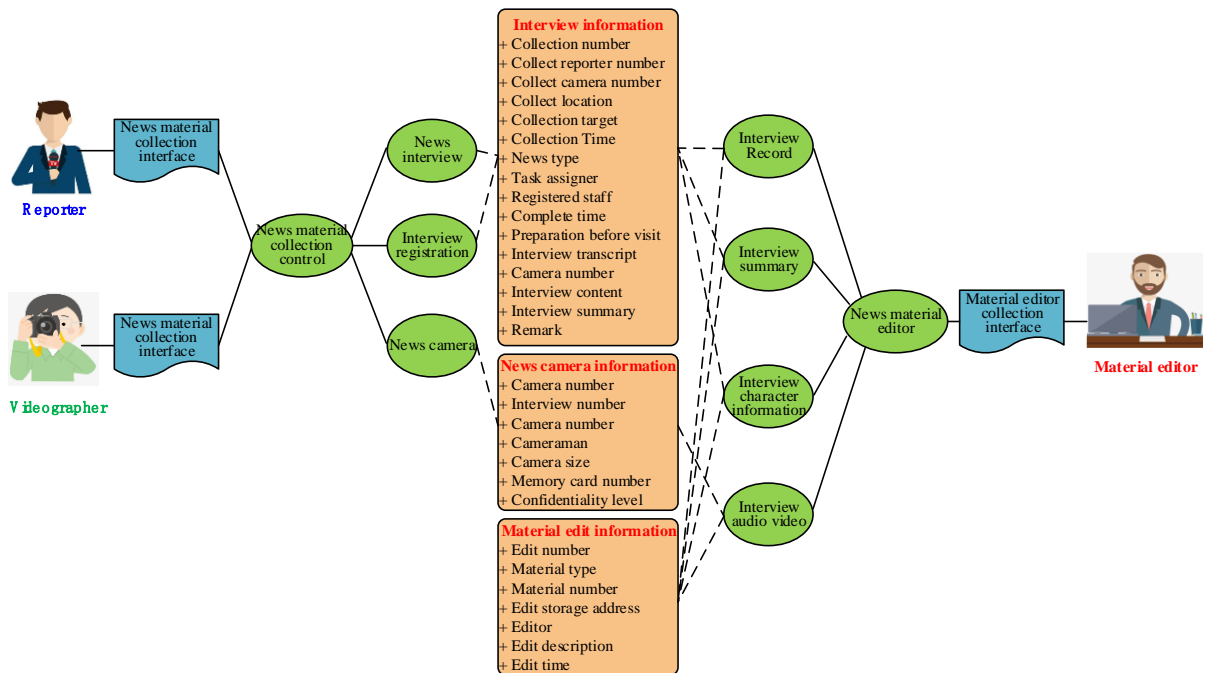

Figure 2: News material collection and editing diagram.

The thumbnail of the news material editing is shown in Figure 2 below. In the news material editing thumbnail, the material editor controls the news material editing control class through the news material editing interface. The news material editing control class relies on the interview record editing class and the interview summary editing class. , Interview character information editing and interview audio and video editing, collecting record editing, interview summary editing, and interview task information editing rely on news interview information and material editing information, interview audio and video editing rely on news camera information and Material editing information class. According to the dependence of the news material editing function on the data entity, all the attributes of the three entity classes of Xinqiao interview information, material editing information and news camera information are respectively given, which are the basis for constructing database tables.

The news material sharing thumbnail class diagram is shown in Figure 3 below. In the news material sharing thumbnail class diagram, the material manager controls the news material sharing control class through the news material sharing interface class, and the news material sharing control class relies on the sharing authority verification class and material The sharing setting category, the permission verification category rely on the sharing permission information category, and the material sharing setting category depends on the material sharing information category. According to the dependence of the news material sharing function on the data entity, all the attributes of the two entity classes, sharing authority information and material sharing information, are respectively given, which are the basis for constructing a database.

The abbreviated circle of news production management is shown in Figure 3 below. In the abbreviated cabinet of news production management, the new idle producer Qiao and news managers operate the news production management control through the news production management interface, and the news production management control depends on news production. Types and production requirements management, news production depends on news production information, production requirements management depends on production requirements information. According to the dependence of the news production management function on the data entity, all the attributes of the news production information and production request information are given respectively, which are the basis for constructing the database decision.
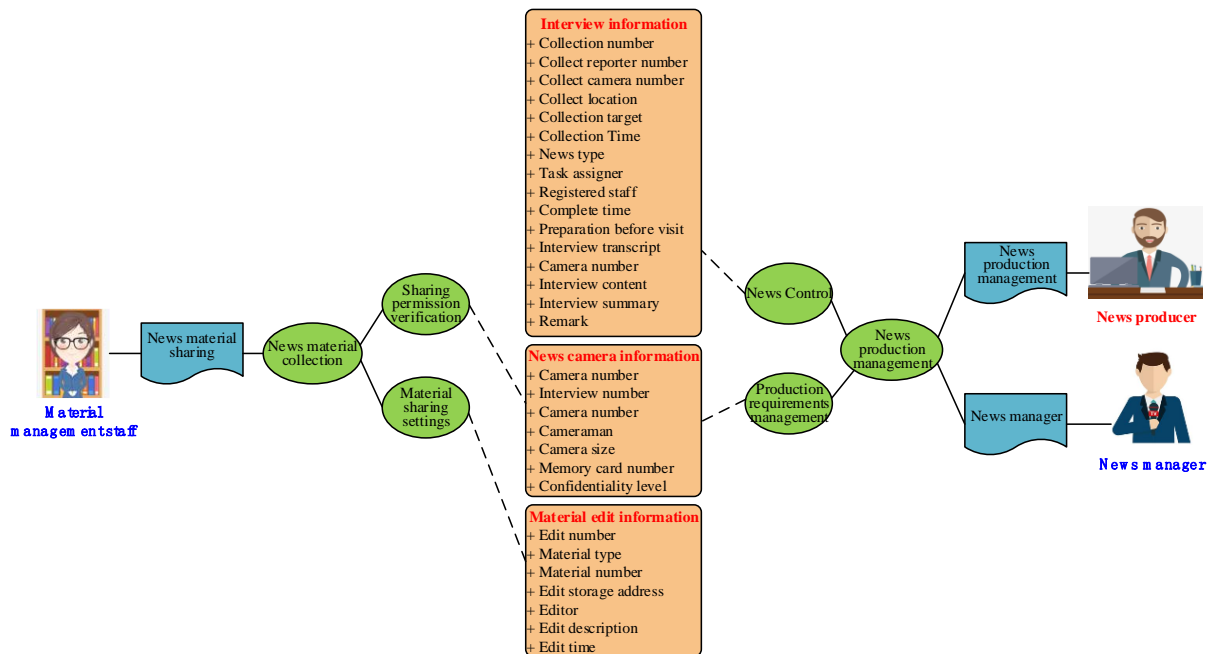

**Figure 3:** News material sharing and production management diagram.

In the thumbnail category of news special effects production, special effects producers and news managers use the news special effect production interface to operate the news special effects production control category. The news special effects control category depends on the special effect production application category, the special effect production review category, and the media material special effect production category. , The special effects production application category depends on the special effects production application information category, the special effects production review category relies on the special effects production review information category, and the special effects production category of media materials relies on the special effect production

information category. According to the dependence of the news special effects production function on data entities, all the attributes of the three entities, namely the news special effect production application information, the news special effect production review information, and the special effect production information, are respectively given. These are the basis for constructing the database table, as shown in Figure 4 and Figure 5.

In the abbreviated cabinet of news broadcast management, news broadcasters and feedback managers use the news broadcast management interface to operate the news broadcast management control class. The news broadcast management control class relies on the news broadcast submission acceptance class, the broadcast log information management class, and the playback feedback processing class. The news broadcast submission acceptance category and the broadcast log information management category rely on the news broadcast information category, and the broadcast feedback processing category depends on the news feedback information category. According to the dependence of the news broadcast management function on data entities, all the attributes of the two entity classes, news broadcast information and news feedback information, are respectively given, which are the basis for constructing database tables.
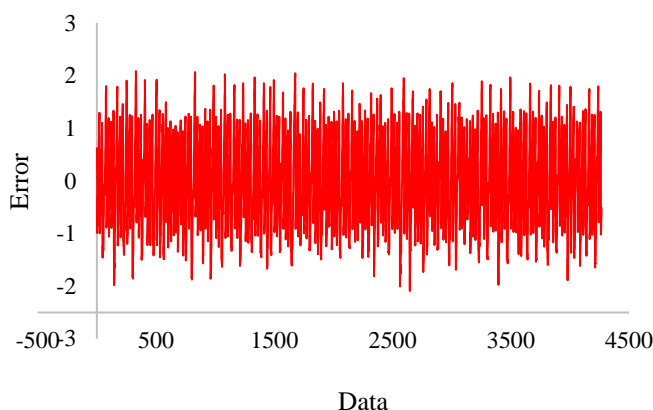
**Figure 4:** Error versus data.
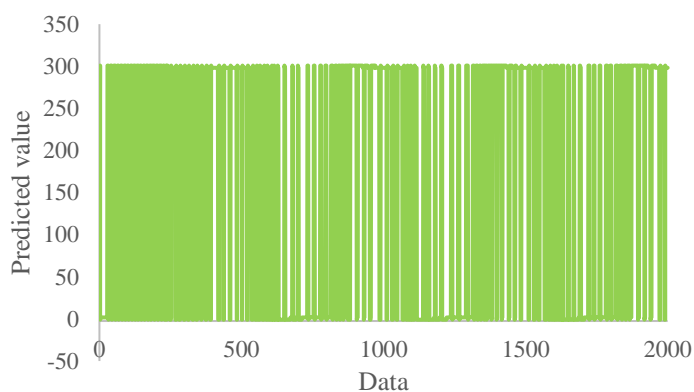
Figure 5: Predicted value.

In the thumbnail of basic data management, system administrators use the basic data management interface of the system to operate basic data management, basic data management depends on

personnel information management, department information management, TV station information management, and personnel information management Rely on personnel information, departmental information management depends on departmental information, and TV station information management depends on TV station information. According to the dependence of the basic data management function on the data entity, all the attributes of the three entity classes of personnel information, department information and TV station information are respectively given, which are the basis for constructing database tables.

System administrators classify operating system management control through the system management community, and system management control depends on system role management, system user management, and system authority management. The system user management class depends on the system user information entity class, the system authority management class depends on the system authority information entity class, and the system role management class depends on the system role information entity class. According to the dependence of the system management function on the data entity, all the attributes of the three entity classes of role information, user information and authority information are given respectively, which are sufficient to build the basis of the database table, as shown in Figure 6 and Figure 7.

The entities in the system database entity relationship diagram mainly include TV station information, department information, personnel information, authority information, role information, user information, sharing authority information, news broadcast information, news feedback information, material sharing information, and material Eighteen entity categories, including editing information, news production information, production requirements information, news interview information, news camera information, special effects production information, special effects production in progress, and special effects production review information. The details are shown in the entity class relationship diagram of the system database. Personnel information and user information and role information are general and special relationships. Therefore, the relationships between their entity classes are represented by symbols of generalized relationships. Permission information and sharing permission information are general and special relationships. Therefore, the relationships between their entity classes are expressed in symbols of generalized relationships. News broadcast information and news feedback information have a general and special relationship.
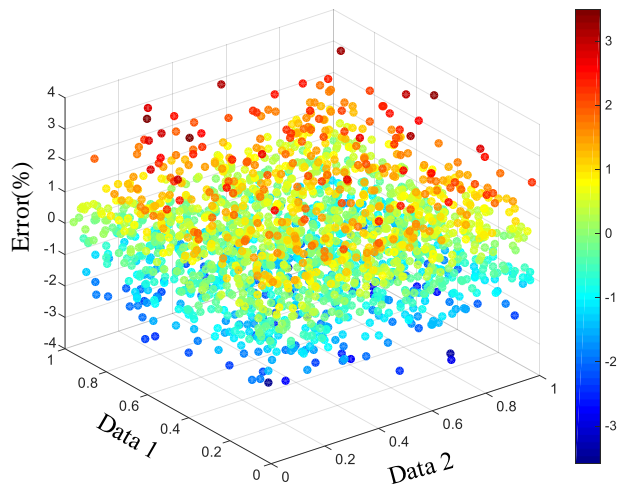
Figure 6: Error variation.

Therefore, the relationship between their entity classes is represented by the symbol of generalized relationship. A TV station has multiple departments, so TV station information and department information have a one-to-many relationship.
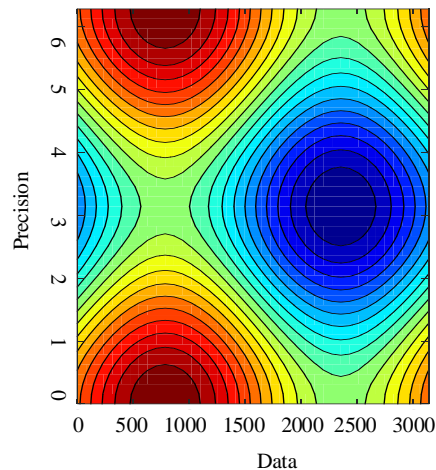
Figure 7: Precision.

Similarly, department information and personnel information also have a one-to-many relationship. Sharing authority information and material sharing information, material sharing information and material editing information, news production information and production requirements information are all one-to-many, and news production application and news production review information are in a one-to-one relationship, because one time News production applications are required, and as long as a news production review is performed, the core and feature production reviews in news production are also one-to-one related.

4   CONCLUSION

This article locates the business issues of news production and broadcasting of TV stations, analyzes the functions and related personnel related to this article, and based on the actual needs of news production and broadcasting of a town TV station, collects news materials, edits news materials, and manages news production. The news broadcast management business process is modeled, and the original business process is further optimized on the basis of the original business process; in the system function analysis part, the paper first analyzes the system roles and gives the overall system Use case diagram modeling. On this basis, the system function requirements are analyzed through the use case diagram, and the system check function structure is analyzed through the function package modeling form: in the data analysis part, the paper analyzes the news production and broadcasting information management of a town TV station The system control class relationship is analyzed, and then the system function data is analyzed through the abbreviated class diagram, and the system entity class relationship diagram and the system database table structure are given.

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